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Application Number	10/628,709
Filing Date	July 28, 2003
First Named Inventor	Atsushi Kono et al.
Art Unit	2835
Examiner Name	Anatoly Vortman
Attorney Docket No.	MAT-8450US

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Application No.: 10/628,709
Appeal Brief Dated: November 8, 2005

MAT-8450US



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. No:	10/628,709
Appellant:	Atsushi Kono, et al.
Filed:	July 28, 2003
Title:	THERMAL FUSE AND METHOD OF MANUFACTURING FUSE
TC/A.U.:	2835
Examiner:	Anatoly Vortman
Confirmation No.:	6708
Notice of Appeal Filed:	September 8, 2005
Docket No.:	MAT-8450US

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
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Alexandria, VA 22313-1450

Sir:

Further to the Notice of Appeal filed September 8, 2005, and in response to the communication dated December 21, 2005, Appellant is submitting this Appeal Brief for the above-identified application.

I. REAL PARTY IN INTEREST

The Real Party In Interest in this matter is Matsushita Electric Industrial Co., Ltd.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to Appellant, Appellant's legal representative, or Appellant's Assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-28 are pending in the application. Claims 1-28 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicants' Admitted Prior Art (AAPA) in view of Sugawara *et al.*, U.S. Patent No. 5,849,424 ("Sugawara"). The rejection of all the pending claims, claims 1-28, has been appealed.

IV. STATUS OF AMENDMENTS

There are no pending, unentered amendments after a Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention relates to a thermal fuse for protecting electrical devices and to its method of manufacture. Specification, Title and page 1, lines 4-7. A thermal fuse comprises (1) a fusible alloy including tin, and (2) lead¹ conductors coupled to both ends of the fusible alloy. *Id.*, Fig. 5 and page 1, lines 10-17. When the lead conductors are connected to the fusible alloy during manufacture, material from the lead conductors may diffuse into the fusible alloy, changing its composition and, consequently, changing the melting temperature of the thermal fuse. *Id.*, page 1, line 17, and page 2, line 12.

Claim 1 is drawn to a thermal fuse comprising the fusible alloy and the lead connectors, in which the connections have surface layers made of metal including tin as a main substance, and the surface layers have thicknesses not greater than 14 μm . *Id.*, page 2, lines 15-19, and claim 1. Claim 10, the only other independent claim pending in the application, is drawn to a method for producing the thermal fuse. *Id.*, claim 10. Dependent claims are drawn to thermal fuses and to methods for producing the thermal fuses in which the surface layers have specific compositions. Claims 19-28. The thermal fuse of the invention has a stable fusing temperature. *Id.*, page 5, lines 7-12, and Figure 6.

¹ "lead," as to direct. Not "lead," as the element, Pb.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The only rejection of record, the rejection of claims 1-28, all the claims pending in the application, under 35 U.S.C. § 103(a) as unpatentable over Applicants' Admitted Prior Art (AAPA) in view of Sugawara *et al.*, U.S. Patent No. 5,849,424 ("Sugawara"), is to be reviewed on appeal.

VII. ARGUMENT

A. LEGAL STANDARD

Obviousness is analyzed using the four step analysis promulgated in *Graham v. John Deere*. *Graham v. John Deere*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966). When obviousness is based on a combination of references, the references must be analogous art. *In re Clay*, 23 USPQ2d 1058, 1060 (Fed. Cir. 1992). Art is analogous if the art is from either (1) the same field of endeavor, regardless of the problem addressed; or (2) a different field of endeavor, but is reasonably pertinent to the particular problem with which the inventor is involved. *Id.* Motivation to combine the references must be shown. *In re Rouffet*, 47 USPQ2d 1453, 1456 (Fed. Cir. 1998); *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Three possible sources for a motivation to combine references have been given: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *Id.* As long as some motivation or suggestion to combine the references is provided by the prior art as a whole, the references need not be combined for the reasons contemplated by the inventor. *In re Beattie*, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992) (citing cases).²

However, a *prima facie* case of obviousness can be rebutted if the applicant can establish (1) the existence of unexpected properties, or (2) that the art in any material respect taught away from the claimed invention. *In re Geisler*, 43 USPQ 1362, 1365

² The Examiner appears to rely on *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993) for this proposition.

(Fed. Cir. 1997) (citing *In re Malagari*, 182 USPQ 549, 553 (CCPA 1974)). A reference that teaches away from a claimed invention cannot be combined with other references make it obvious. *Winner Int'l Royalty Corp. v. Wang*, 53 USPQ2d 1580, 1582 (Fed. Cir. 2000); *Tec Air, Inc. v. Denso Mfg. Michigan Inc.*, 52 USPQ2d 1294, 1298 (Fed. Cir. 1999); *In re Grasselli*, 218 USPQ 769, (Fed. Cir. 1983); see also *United States v. Adams*, 383 U.S. 39, 148 USPQ 479, 484 (1966) ([k]nown disadvantages in old devices which would naturally discourage search for new inventions may be taken into account in determining obviousness).

B. REJECTION UNDER 35 U.S.C. § 103(a)

Claims 1-28, all the claims pending in the application, stand rejected as unpatentable over Applicants' Admitted Prior Art (AAPA) in view of Sugawara, U.S. Patent No. 5,849,424 (Sugawara).

AAPA, the primary reference, was cited for the general disclosure of the existence and structure of thermal fuses. Office Action of May 6, 2005, page 2, line 16, to page 3, line 2. For the AAPA, the Examiner refers to the specification: Fig. 5; p. 1, lines 10-27; and p. 11, lines 1-12. *Id.* This citation is only partly correct. There is no page 11 in the specification. The specification is only ten pages long.

Further, the Examiner asserts that "column 5, lines 65-67 and column 6, line 7 and 8," discloses AAPA. Office Action of May 6, 2005, page 2, line 20, to page 3, line 1. This assertion is traversed. It is incorrect. The cited passage, "column 5, lines 65-67 and column 6, line 7 and 8" is not part of the appellants' specification. Appellants' specification has page numbers, not column numbers. The Examiner appears to be referring to some other document, possibly Sugawara, not to appellants' specification. Consequently, the alleged disclosure of "column 5, lines 65-67 and column 6, line 7 and 8" is not part of AAPA.

The difference between AAPA and the claimed invention is that AAPA does not disclose surface layers including tin as a main substance provided on the lead conductors of the thermal fuse, the surface layers having thicknesses not greater than 14 μm .

Sugawara, the secondary reference, discloses a process for producing a layer of copper alloy having high surface hardness on the surface of copper by (1) coating the surface of a copper alloy with a layer of tin or a tin alloy, and (2) heat treating the coated copper alloy to form on the surface thereof a high hardness coating containing Cu-Sn intermetallic compounds. Sugawara, Abstract. The resulting coated copper alloy has a high surface hardness and improved resistance to abrasion and corrosion, which permits producing terminal connectors there from. *Id.*

As will be apparent from the discussion below, a key issue in this appeal is the composition of the product of Sugawara's invention. The Examiner's position, which is essential to the rejection, is that Sugawara's invention produces tin-covered electrical connectors. Advisory Action of August 22, 2005, page 2, lines 21-28; Office Action of May 6, 2005, page 3, lines 3-6. For the reasons given below, appellants strongly traverse this assertion. Appellants' position is that Sugawara's invention produces connectors that are covered with a layer of copper/tin alloy in which the major component is copper, not tin, and, further, that Sugawara disparages tin-covered connectors, thus teaching away from appellants' invention. This position, and the citations from Sugawara supporting it, is outlined more fully in the discussion below.

For the reasons discussed below, appellants submit the rejection is improper and should be reversed.

1. *Sugawara is Not Analogous Art*

For a reference to be combined to create a *prima facie* case of obviousness it must be "analogous art.". *In re Clay*, 23 USPQ2d 1058, 1060 (Fed. Cir. 1992). For a reference to be analogous art it must either (1) be from the same field of endeavor, regardless of

the problem addressed; or (2) be reasonably pertinent to the particular problem with which the inventor is involved. *Id.*

Sugawara and appellants' invention do not address the same problem, and the Examiner has not asserted that they do. Sugawara is concerned with the problem of increased friction and delamination of conventional tin-plated connections. Sugawara, column 1, lines 26-41. Appellants' invention addresses the problem of variation in the fusing temperature of the fusible alloy in a thermal fuse. Specification, page 1, line 18, to page 2, line 12.

However, the Examiner has asserted the AAPA and Sugawara are from the same field of endeavor, "tin covered electrical connectors and devices employing them". Office Action of May 6, 2005, page 3, lines 6-7.

Appellants' position is that "tin covered electrical connectors and devices employing them" is not a field of endeavor. Electrical connectors, which includes Sugawara, and electrical devices, which includes appellants' invention, are two separate and distinct art areas. Because of their different uses, they have different use requirements. Connectors, for example, are subject to constant insertion and withdrawing and must be highly resistant to abrasion and delamination and should have decreased friction during the insertion and withdrawing process. Sugawara, column 1, lines 10-32. Thermal fuses have no such requirements. Unlike electrical connectors, they are not constantly inserted and withdrawn. Instead, they need a fusing temperature that has minimum variability. Specification, page 1, line 25, to page 2, line 12.

In response, the Examiner has asserted that "different use is not characteristic of the different filed of endeavor." Advisory Action of August 22, 2005, page 2, lines 11-12. This is legal error. The similarities and differences in structure and function of the disclosed inventions carry great weight in determining whether a reference is analogous art. *See, for example*, MPEP 2141.01(a)(II) (*citing In re Ellis*, 177 USPQ 526, 527 (CCPA 1973)) (emphasis added). In the leading case on analogous art, the Federal Circuit found that a reference relating to petroleum production was not analogous art to an

invention relating to the storage of refined petroleum products, even though both related to the petroleum industry. *In re Clay*, 23 USPQ2d 1058 (Fed. Cir. 1992). In making this determination, the Federal Circuit stressed the differences in the conditions of use between the two inventions:

The PTO argues that Sydansk and Clay's inventions are part of a common endeavor - "maximizing withdrawal of petroleum stored in petroleum reservoirs." However, Sydansk cannot be considered to be within Clay's field of endeavor merely because both relate to the petroleum industry. Sydansk teaches the use of a gel in unconfined and irregular volumes within generally underground natural oil-bearing formations to channel flow in a desired direction; Clay teaches the introduction of gel to the confined dead volume of a man-made storage tank. The Sydansk process operates in extreme conditions, with petroleum formation temperatures as high as 115°C and at significant well bore pressures; Clay's process apparently operates at ambient temperature and atmospheric pressure. Clay's field of endeavor is the storage of refined liquid hydrocarbons. The field of endeavor of Sydansk's invention, on the other hand, is the extraction of crude petroleum.

In re Clay, 23 USPQ2d 1058, 1060 (Fed. Cir. 1992).

As is apparent from this passage, the conditions of use are important in defining the field of endeavor.

Further, the inventor's own statement of the field of endeavor can be taken into consideration. *In re Wood*, 202 USPQ 171, 174 (Fed. Cir. 1979) (appellants' statements concerning their field of endeavor contradict statements in their own specification). Sugawara expressly states that his invention relates to copper alloys, not to tin-covered electrical connectors:

This invention relates to copper alloys and a process for the production thereof. The term "copper alloys" herein used includes in the strict sense both copper and copper alloys.

Sugawara, column 1, lines 7-9 (emphasis added).

For these reasons, Sugawara is not analogous art. Consequently, the Examiner has not made the *prima facie* case. Because Sugawara is not analogous art, it may not be combined with AAPA to produce a *prima facie* case of obviousness. The rejection of claims 1-28 as unpatentable over AAPA in view of Sugawara should be reversed.

2. *The Devices Produced by Sugawara's Invention Are Not "Tin-Covered"*

The Examiner asserts that "both inventions teach tin covered electrical connectors" and asks "How is this not the same field of endeavor?" Advisory Action of August 22, 2005, page 2, lines 12. The answer to the Examiner's rhetorical question is straightforward. Even assuming for the sake of argument that there is such a field of endeavor as "tin covered electrical connectors and devices employing them, "the devices produced by Sugawara's invention are not "tin covered."

The devices produced by Sugawara's invention are covered by a surface layer of high hardness containing copper-tin intermetallic compounds. As explained in Sugawara:

The process of the invention comprises the steps of coating the surface of a copper-base alloy material with Sn or an Sn-alloy coating followed by applying heat treatment to the coated surface, thereby forming in the surface treated layer on said material a very hard coating containing Cu-Sn system intermetallic compounds. By doing this, the present invention provides a copper-base alloy having a surface which is suitable when used as a connector or as a charging-socket of an electric automobile because of its having a low coefficient of friction and superiority in resistance to abrasion.

Sugawara, column 1, lines 60-66 (emphasis added); see *also*, Sugawara, Abstract.

As shown by the cited passage above, Sugawara expressly discloses devices in which the surface layer is a copper-tin intermetallic compound, not a layer of tin. The connectors are covered with "a coated alloy having a high hardness surface coating containing Cu-Sn intermetallic compounds, such as Cu_3Sn [about 39 wt% tin] and Cu_4Sn [about 32 wt% tin]." Sugawara, column 6, lines 32-35 (calculated wt% tin added). Connectors whose surface layer contains at most 39 wt% tin in a Cu-Sn intermetallic compound are not "tin-covered." Further, the properties of the surface layers are different. Surface layers of tin are subject to delamination. Sugawara, column 1, lines 35-41. The layers produced by Sugawara's invention are not subject to delamination. Sugawara, column 6, lines 54-63.

The Examiner asserts that Sugawara produces tin-covered electrical devices and relies the fact that Sugawara mentions a "tin coating" in several places to support this assertion: "column 2, lines 4-8, 39-41, 47-49, and 58-59; column 5, lines 52-67; and column 6, lines 1+, etc." Advisory Action of August 22, 2005, page 2, lines 22-24; Advisory Action of July 29, 2005, page 2, lines 4-7.

Each of these citations is being read out of context. None of these passages refer to the devices produced by Sugawara's invention. As described in the passage reproduced above, Sugawara discloses a two step process:

- (1) Coating the surface of a copper alloy with a layer of tin or a tin alloy, and
- (2) Heat treating the coated copper alloy to form on the surface thereof a high hardness coating containing copper-tin intermetallic compounds.

Sugawara, Abstract; column 1, lines 60-66; and claim 17.

Column 2, lines 4-8, 39-41, 47-49, and 58-59, cited by the Examiner, all are found in a description of the first step of Sugawara's process, coating the surface of a copper alloy with a layer of tin or a tin alloy. Presumably a tin covered intermediate is produced in this first step. However, the tin covered intermediate is not the final product of Sugawara's invention. There is an additional step, a heating step, in which a surface layer of a high hardness coating containing copper-tin intermetallic compounds is formed. Sugawara, column 2, line 61, to column 2, line 9.

Column 5, lines 52-67, describe the thickness of the tin coating applied in the first step, to form the tin covered intermediate. Column 6, lines 1+ describe methods for forming the tin coating in the first step. Reading the cited passages in context, the section following these two cited passages describes heat treatment of the tin covered intermediate. Sugawara, column 6, lines 9-53. "As a result of the heat treatment, Cu diffuses from the alloy body into the surface coating, to provide a coated alloy having a high hardness surface coating containing Cu-Sn intermetallic compounds, such as Cu₃Sn and Cu₄Sn." Sugawara, column 6, lines 33-35.

Only by reading these passages out of context and ignoring Sugawara's full disclosure can one conclude that Sugawara's invention produces tin-covered connectors. Reading passages of a reference out of context and ignoring the full disclosure of the reference is legal error. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.* 230 USPQ 416, 419 (Fed. Cir. 1986); *In re Wesslau*, 147 USPQ 391, 393 (CCPA 1965) ; *see also In re Mercier*, 185 USPQ 774, 778 (CCPA 1975) (*all the relevant teaching of the cited reference must be considered in determining what they fairly teach to one having ordinary skill in the art*) (emphasis original).

Consequently, none of the passages relied on by the Examiner disclose what the Examiner asserts that they do, that the devices produced by Sugawara's invention are tin coated. They disclose that an intermediate produced in Sugawara's process is tin coated, not that the devices produced by the invention are tin coated.

For this additional reason, the Examiner has not made the *prima facie* case. The devices produced by Sugawara's invention are not tin coated. Therefore, assuming for the sake of argument that the references can be combined, combination of the references in the manner proposed by the Examiner does not produce appellants' invention. For this additional reason, the rejection of claims 1-28 as unpatentable over AAPA in view of Sugawara should be reversed.

3. *There is No Motivation to Combine the References*

The Federal Circuit requires the Examiner to show a motivation to combine the references that create the case of obviousness. *In re Rouffet*, 47 USPQ2d 1453, 1456 (Fed. Cir. 1998); *In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Assuming for the sake of argument that the references can be combined, there is no motivation to combine the references.

The Examiner asserts that Sugawara disclose a lead connector having a surface layer of tin for improving workability and corrosion resistance. Office Action of May 6, 2005, page 3, lines 3-5 (emphasis original). Therefore, the person of ordinary skill in the art would combine the references to improve workability and resistance to corrosion of the lead connectors. *Id.*, lines 10-14.

As described above, Sugawara discloses a two step process in which a copper alloy with a layer of tin or a tin alloy is formed in the first step. Sugawara, column 5, line 52, to column 6, line 8. In the second step, the copper alloy with a layer of tin or a tin alloy is heated. Sugawara, column 6, lines 21-28. "As a result of the heat treatment, Cu diffuses from the alloy body into the surface coating, to provide a coated alloy having a high hardness surface coating containing Cu-Sn intermetallic compounds, such as Cu₃Sn and Cu₄Sn. Sugawara, column 6, lines 32-35. It is the surface layer formed in the second step, not the layer of tin formed in the first step, that improves workability and corrosion resistance. Sugawara, Abstract

The Examiner asserts that the person of ordinary skill in the art would combine the references to improve workability and resistance to corrosion of the lead connectors. However, the copper alloy with a layer of tin or a tin alloy, formed in the first step, does not have these improved properties. Sugawara, column 1, lines 26-41. To the contrary, Sugawara disparages tin-plated surfaces. Sugawara, column 1, lines 25-41. Only after the second step, are the improved properties present. Sugawara, column 6, lines 54-63. After this step, there is no longer a tin coating. Sugawara, column 6, lines 32-35.

The alleged motivation to combine Sugawara with the AAPA is based on features which do not appear in Sugawara until after heating, which converts the surface layer to copper/tin intermetallic compounds. Consequently, if AAPA and Sugawara were combined, a thermal fuse with a surface layer of copper/tin intermetallic compounds would be produced. This is not appellants' invention.

The Examiner has not made the *prima facie* case. There is no motivation to combine Sugawara with AAPA to produce a *prima facie* case of obviousness. For this additional reason, the rejection of claims 1-28 as unpatentable over AAPA in view of Sugawara should be reversed.

4. *Sugawara Teaches Away for the Invention*

Sugawara disparages tin-plated surfaces. Sugawara teaches that:

With the recent development of the electronics industry, electric wiring in various machines is becoming more and more complicated and highly integrated, and this has caused use of connectors having an increased number of pins. Conventional connectors having Sn-plated surfaces have encountered a problem in that the practical use thereof is becoming more and more difficult because of the increased friction at the times of insertion and drawing.

Currently available electric automobiles require charging at least once a day. Thus, it is necessary that a charging-socket is highly resistant to abrasion. In addition, since a large amount of electric current such as 10A or more flows in sockets and therefore a large amount of heat is generated, a new problem that Sn-plated surfaces of sockets obtained by a conventional method cannot withstand the delamination of the plated surface has occurred.

Sugawara, column 1, lines 26-41.

Sugawara expressly discloses two specific disadvantages of tin plated connectors:

- (1) increased friction, and
- (2) delamination.

Therefore, the person of ordinary skill in the art, would not be motivated to combine AAPA with Sugawara to produce a tin plated surface because Sugawara teaches the disadvantages of a tin plated surface.

The Examiner has not made the *prima facie* case. A reference that teaches away from an invention cannot be combined with other references to make it obvious. Consequently, Sugawara can not be combined with AAPA to produce a *prima facie* case of obviousness. For this additional reason, the rejection of claims 1-28 as unpatentable over AAPA in view of Sugawara should be reversed.

5. *Claims 19-23 and 24-28*

Claims 19-23 are each drawn to a thermal fuse. Each claim recites a specific composition for the surface layer. These claims have been rejected as merely the result of "routine experimentation." Office Action of May 6, 2005, page 4, lines 1-14.

Numerous other chemical elements, at wide ranges of concentrations, may be present in alloys. Sugawara, for example, the reference on which the Examiner relies, discloses about 25 other elements that may be present in copper alloys. Sugawara, column 3, lines 47-57; *see also* column 5, lines 4-37.

Most research inherently involves "experimentation." However, discovery of these particular compositions is more than routine, given the large number of chemical elements, combinations of chemical elements, and ranges of concentrations for these chemical elements that are possible. For this additional reason, the rejection of claims 19-23 should be reversed.

Similar considerations also apply to method claims 24-28, which also recite the same specific compositions for the surface layer. For this additional reason, the rejection of method claims 24-28 should be reversed.

6. *Method Claims 10-18 and 24-28*

Claims 10-18 and 24-28 are method claims, drawn to a method for producing the thermal fuse. The Examiner rejected as "inherently necessitated" by the device structure as taught by the combination of AAPA and Sugawara. Office Action of May 6, 2005, page 4, lines 15-16.

For the reasons stated above, the combination of AAPA and Sugawara is improper. As the combination is improper, the rejection is not "inherently necessitated" by this combination and should be reversed.

Further, the Examiner has not made a record to support the assertion that the rejection is "inherently necessitated" by this combination. *See, In re Lee*, 61 USPQ 1430, 1432-34 (Fed. Cir. 2002) (agency findings must be supported by the record); *see also*, 37 CFR 1.104(c)(2) (particular part of reference relied upon must be designated as nearly as practicable). The Examiner has not explained how a device structure can inherently

necessitate rejection of fourteen different method claims. For this additional reason, the rejection of claims 10-18 and 24-28 should be reversed.

7. *Rejection of Claims 1, 2, and 8*

In a rejection characterized by the Examiner as an alternate ground for rejection, the Examiner has rejected claims 1, 2, and 8, alleging that discovering the claimed thickness range, "not greater than 14 μ m and not less than 1 μ m"³, involves only routine skill in the art. Office Action of 5/6/2005, page 3, lines 15-20; see *a/so*, communication of 12/21/2005, item 10.

Appellants believe that this rejection depends on the combination of AAPA and Sugawara, addressed above, and that this is an argument in support of this rejection. The rejection appears in the Office Action under ¶3, headed "Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of US/5,849,424 to Sugawara et al, Sugawara", not under a separate heading. Office Action of 5/6/05, page 2, lines 14-15.

The AAPA/Sugawara combination has been discussed above. If AAPA and Sugawara cannot be combined in the manner proposed by the Examiner, thermal fuses in which the lead connectors have surface layers of tin are not produced, and, thus, there would be no occasion to optimize such non-existent layers using routine skill in the art. For the reasons given above with respect to the AAPA/Sugawara combination, this rejection of claims 1, 2, and 8 as unpatentable over AAPA in view of Sugawara is improper and should be reversed.

Alternatively, the Examiner may be asserting that the rejection depends only on the AAPA, that is, claims 1, 2, and 8 are unpatentable over the AAPA. Such a rejection is not expressly stated in the Office Action and, thus, would constitute a new ground for rejection. However, in the interest of expediting prosecution, appellants will address such a rejection, if in fact, it has been made.

³ The "not less than 1 μ m" limitation appears in claim 9, not in claim 1, claim 2, and/or claim 8.

The Examiner alleges that the AAPA discloses "surface layers (2a) made of composition having no orientation and comprising metal including tin as main substance (i.e. substantially entirely made of tin) (column 5, lines 65-67 and column 6, lines 7 and 8)". Office action of 5/6/2005, page 2, line 16, to page 3, line 1. This is incorrect. As discussed above, "column 5, lines 65-67 and column 6, lines 7 and 8", the section of the specification relied on for this alleged disclosure, are not part of appellants' specification. Appellants specification has page numbers, not column numbers. "column 5, lines 65-67 and column 6, lines 7 and 8" are part of some other document, possibly Sugawara.

The Examiner has mistakenly attributed the disclosure of Sugawara, or of some other reference, to appellants. What appellants' specification discloses is that the plating layer is a Sn/Pb alloy. Specification, page 1, lines 10-15. Consequently, the AAPA does not disclose surface layers "substantially entirely made of tin." Because surface layers substantially entirely made of tin are missing from the AAPA, such non-existent layers could not be optimized by routine skill in the art. For this reason, the rejection of claims 1, 2, and 8 as unpatentable over the AAPA, if in fact such a rejection has been made, should be reversed.

C. CONCLUSION

For the reasons discussed above:

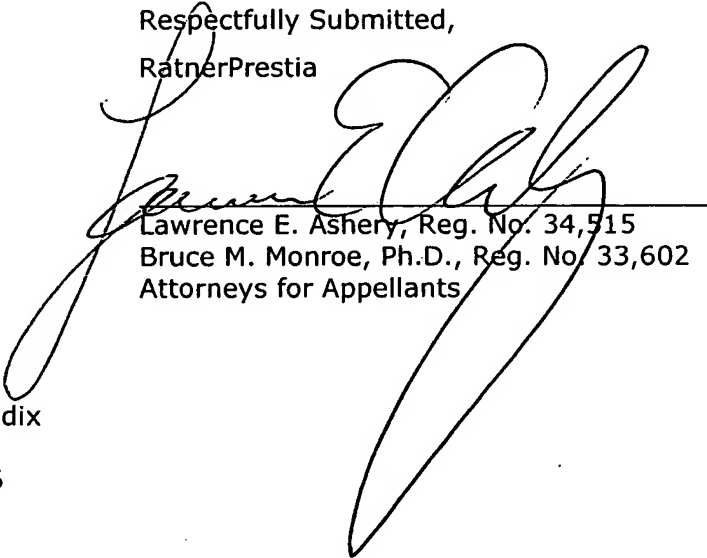
- (1) Sugawara is not analogous art and cannot be combined with AAPA to produce appellants' invention;
- (2) the product of Sugawara's invention is not a tin-covered connector so the combination of Sugawara and AAPA does not product appellants' invention;
- (3) there is no motivation to combine Sugawara and AAPA to produce appellants' invention;

(4) Sugawara cannot be combined with AAPA because it teaches away from appellants' invention; and

(5) the Examiner has mistakenly attributed the disclosure of some other reference to appellants.

For each of these reasons the rejection of claims 1-28 of the instant application as unpatentable over AAPA in view of Sugawara should be reversed, and such action is earnestly solicited.

Respectfully Submitted,
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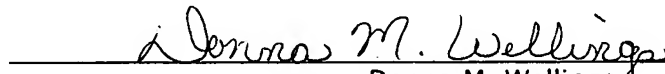
Enclosure: Claims Appendix

Dated: January 23, 2006

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The Assistant Commissioner is hereby authorized to charge payment to Deposit Account No. **18-0350** of any fees associated with this communication.

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Donna M. Wellings

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APPENDIX OF CLAIMS

Listing of Claims:

1. A thermal fuse comprising:

a fusible alloy including tin;

a couple of lead conductors connected to both ends of said fusible alloy, respectively; and

surface layers made of metal including tin as a main substance provided on said lead conductors, respectively, said surface layers having thicknesses not greater than 14 μ m.

2. The thermal fuse according to claim 1, wherein said surface layers are substantially entirely made of tin.

3. The thermal fuse according to claim 1, wherein said surface layers include silver.

4. The thermal fuse as defined in claim 3, wherein said surface layers include copper.

5. The thermal fuse according to claim 4, wherein said surface layers include bismuth.

6. The thermal fuse according to claim 1, wherein said surface layers include copper.

7. The thermal fuse according to claim 1, wherein said surface layers include bismuth.

8. The thermal fuse according to claim 1, wherein said surface layers have composition having no orientation.

9. The thermal fuse according to claim 1, wherein said thicknesses of said surface layers are not less than 1 μ m.

10. A method of manufacturing a thermal fuse, comprising the steps of:

preparing a fusible alloy including tin, and a couple of lead conductors having surface layers formed thereon, respectively, the surface layers being made of metal including tin as a main substance and having thicknesses not greater than 14 μ m; and

connecting the lead conductors to both ends of the fusible alloy, respectively.

11. The method according to claim 10, wherein the surface layers are substantially entirely made of tin.

12. The method according to claim 10, wherein the surface layers include silver.

13. The method according to according to claim 12, wherein the surface layers include copper.

14. The method according to claim 13, wherein the surface layers include bismuth.

15. The method according to claim 10, wherein the surface layers include copper.

16. The method according to claim 10, wherein the surface layers include bismuth.

17. The method according to claim 10, wherein the surface layers have composition having no orientation.

18. The method according to in claim 10, wherein the thicknesses of the surface layers are not less than 1 μ m.

19. The thermal fuse according to claim 1, wherein the surface layers comprise 95 to 99 wt.% tin and 1 to 5 wt.% silver.

20. The thermal fuse according to claim 1, wherein the surface layers comprise 97 to 99.5 wt.% tin and 0.5 to 3 wt.% copper.

21. The thermal fuse according to claim 1, wherein the surface layers comprise 96 to 99.7 wt.% tin and 0.3 to 4 wt.% bismuth.

22. The thermal fuse according to claim 1, wherein the surface layers comprise 95 to 97 wt.% tin, 2 to 5 wt.% silver and 0.3 to 1.5 wt.% copper.

23. The thermal fuse according to claim 1, wherein the surface layers comprise 95 to 97 wt.% tin, 2 to 4 wt.% silver, 0.3 to 1.5 wt.% copper and 0.3 to 1 wt.% bismuth.

24. The method according to claim 10, wherein the surface layers comprise at least 95 to 99 wt.% tin and 1 to 5 wt.% silver.

25. The method according to claim 10, wherein the surface layers comprise at least 97 to 99.5 wt.% tin and 0.5 to 3 wt.% copper.

26. The method according to claim 10, wherein the surface layers comprise at least 96 to 99.7 wt.% tin and 0.3 to 4 wt.% bismuth.

27. The method according to claim 10, wherein the surface layers comprise at least 9.5 to 97 wt.% tin, 2 to 5 wt.% silver and 0.3 to 1.5 wt.% copper.

28. The method according to claim 10, wherein the surface layers comprise at least 95 to 97 wt.% tin, 2 to 4 wt.% silver, 0.3 to 1.5 wt.% copper and 0.3 to 1 wt.% bismuth.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None